



# Teaching Population Health: Innovative Medical School Curricula on Nutrition


January 20, 2016  
1:00-2:30 p.m. EST

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## Welcome & Introductions

Malika Fair, M.D., M.P.H.



- Director of Public Health Initiatives, AAMC
- Assistant Clinical Professor, Department of Emergency Medicine, The George Washington School of Medicine and Health Sciences
- M.D., University of Michigan Medical School
- Emergency Medicine Residency, Carolinas Medical Center



## Webinar Objectives

- Discuss innovative ways to teach nutrition in clinically relevant scenarios and as the foundation for population health perspectives
- Understand the benefits and challenges of current curriculum models to improve medical students' training in the pre-clinical and clinical years
- Provide a forum for faculty and learners to collaborate and discuss opportunities for curriculum and clinical training improvement moving forward



Moderator: Jennifer Nelson, M.D., M.P.H.  
Centers for Disease Control and  
Prevention



- Epidemic Intelligence Service (EIS) Officer in the Nutrition Branch, Infant Feeding Team at CDC
- M.D., Morehouse School of Medicine
- Pediatrics Residency, Emory University affiliated hospitals
- M.P.H. in Epidemiology, Emory University



## Webinar Panelists



Dr. Martin Kohlmeier



Dr. Virginia Uhley



## Martin Kohlmeier, M.D., Ph.D.



- University of North Carolina at Chapel Hill, Department of Nutrition
- UNC Nutrition Research Institute, Kannapolis
- Director of the Nutrition in Medicine (NIM) project
- M.D. and Residency, Heidelberg University



## Objectives



- Report on the state of nutrition education at U.S. medical schools
- Present instructional and assessment approaches of the NIM curriculum
- Consider opportunities for building stronger clinical nutrition skills



## Nutrition Training Boosts Population Health



- Most Americans would benefit from evidence-based nutrition guidance
- Trained physicians achieve better health outcomes and save time
- Nutrition knowledge helps physicians to counter myths and false claims



## What Needs to be Taught?



## Nutrition Education Surveys

- Targeted at all accredited programs in the U.S.
- Medical schools, schools of osteopathic medicine
- Conducted at approximately 4-year intervals
- Online questionnaire, with email/phone alternatives
- Carried out without dedicated funding support
- Needs more permanent support



## Nutrition Education in Medical Schools Continues to be Inadequate

	2000	2004	2008	2012
<b>Combined Hours (SEM)</b>	20.4 (1.4)	22.3 (1.6)	19.5 (1.4)	19.0 (1.2)
<b>Response Rates</b>	89%	84%	86%	91%

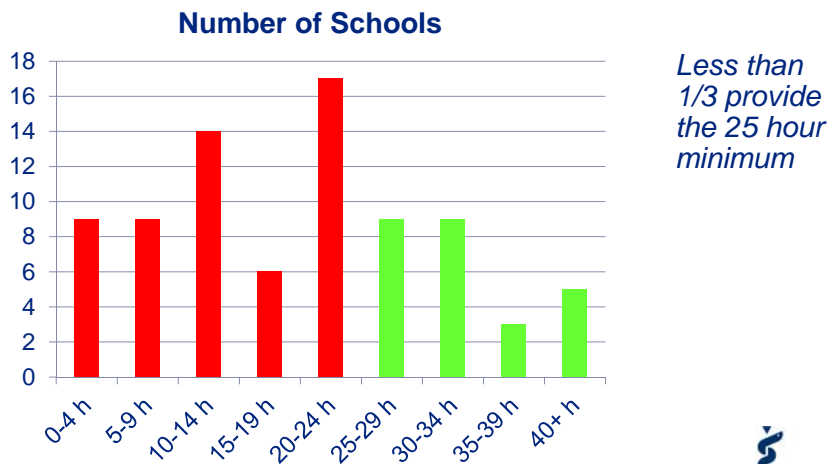


## An Increasing Number of U.S. Medical Schools Fail to Require any Nutrition Education

	2000	2004	2008	2012
<b>No Required Course</b>	<b>5%</b> (6/112)	<b>7%</b> (7/106)	<b>5%</b> (5/109)	<b>10%</b> (12/121)
<b>Response Rates</b>	89%	84%	86%	91%



## Most Medical Schools Fail to Require the Recommended Amount of Nutrition Education



## Where is Nutrition Taught in the Curriculum?

Type of Course	Schools	Hours (SEM)
Integrated Course	68%	12.6 (1.3)
Clinical Practice	45%	6.4 (1.0)
Biochemistry	37%	6.4 (1.1)
Physiology/Pathology	29%	4.2 (0.6)
Nutrition	18%	13.8 (2.1)
Other	11%	10.0 (3.1)



## Nutrition Education in Medical Schools Continues to be Inadequate

	2000	2004	2008	2012
<b>Required Nutrition Course</b>	<b>35%</b> (39/112)	<b>30%</b> (32/106)	<b>25%</b> (26/105)	<b>18%</b> (22/121)
<b>Response Rates</b>	89%	84%	86%	91%





## Nutrition in Medicine



Lessons



Tools



Case studies



Review questions



## NIM Resources are Widely Available

- Currently over 40 modules of 15-60 min length
- Evidence-based instruction of clinical skills
- Run on any standard desktop or laptop
- Used by students at 130 of 176 U.S. schools
- Chosen by programs in 23 other countries
- Funded by NCI, ODS, USDA and others



## Nutrition in Medicine (NIM) Online Instruction Works for Medical Schools

Medical schools with our online courses provide 33% more nutrition education

2012	n	Hours (SEM)
<b>Using NIM courses</b>	44	22.1 (1.8)
<b>No NIM Courses</b>	77	17.4 (1.4)

P<0.04

Adams, Butsch, Kohlmeier. Journal Biomed Ed. 2014.



## Example: Dietary Assessment by Physicians

### Assessing Vitamin E, C, and Carotenoid Intake

#### Vitamin E

Are mostly non-fat foods eaten?



**Alarm Threshold:**  
avoids oils, fats, nuts, and seeds

#### Vitamin C

How many servings of fruits and non-starchy vegetables a day?



**Alarm Threshold:**  
fewer than 1 serving

#### Carotenoids

How many servings of orange, yellow or dark-green fruits and vegetables per day?



**Alarm Threshold:**  
fewer than 1 serving

Who is at increased risk for low antioxidant intake?

**Vitamin E:** Look for people who use mainly fat-free foods and avoid added fat.

**Vitamin C:** Look for people who eat few fruits and vegetables.

**Carotenoids:** Look for people who eat few fruits and vegetables.

## Reinforcement with Practice Cases

### Interaction: Case Studies



All of these patients do not regularly use vitamin or mineral supplements. Which nutrient should you be most concerned about?



**Q:** How many servings of fruits or vegetables do you eat on a typical day?



**A:** I have to confess I rarely have any vegetables or fruits, I don't even like juice.



#### Select Nutrient

- vitamin B12
- vitamin D
- vitamin E
- vitamin C
- thiamin
- calcium

## Emphasizing What they Need to Know

### Key Concept

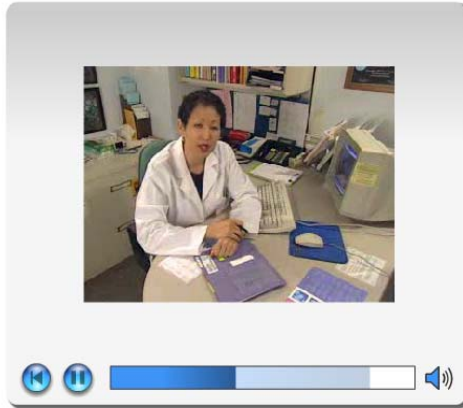
**You should memorize assessment questions and criteria related to inadequate vitamin E, C, and carotenoid intakes.**

People with restricted diets who do not take supplements may be at risk for vitamin deficiency. Vitamin E is found in oils, fats, nuts, and seeds. People who use mainly fat-free foods and avoid added fat are at risk for deficiency. Good sources of vitamin C are fruits and vegetables such as citrus, berries, tomatoes, broccoli, cauliflower, and peppers. A person who eats < 1 serving/d of fruits and vegetables should raise a red flag for potential deficiency. Carotenoids are found in orange, yellow, or dark-green fruits and vegetables. Less than 1 serving/d puts a person at risk.



# Use of Assessment Skills in Practice

## Introduction to the Patient



### Patient Information:

Joseph Bradley, age 63  
Non-smoker, hypertensive. Excellent compliance to diet and exercise. Suffered mild myocardial infarction 2 months ago, will start cardiac rehab in 2 weeks.

**Height:** 1.79 m (5'10")

**Weight:** 81.8 kg (180 lb)

**BMI:** 26

Cholesterol 223 mg/dl; HDL 33 mg/dl; LDL 144 mg/dl

**Blood pressure:** 146/88

**Meds:** loop diuretic, ACE-inhibitor, statin

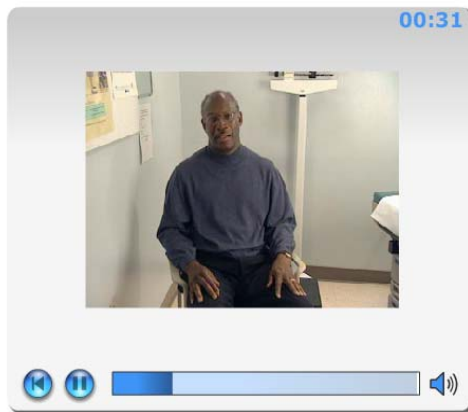
### MISSION:

Your task is to evaluate Mr. Bradley's antioxidant intake.

Your time spent working with the patient will be displayed on screen. Your use of time will be reflected in your performance evaluation.

# Use of Assessment Skills in Practice

## Interview the Patient



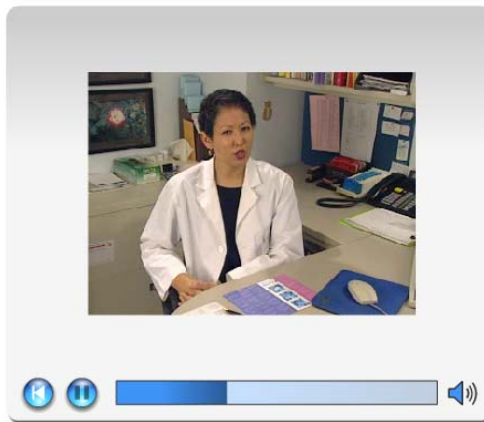
*Use time efficiently and be sure to take notes. Ask targeted questions related to antioxidant intake.*

- How have you been feeling?
- Have you tried losing weight in the past?
- Tell me about your fruit and vegetable intake.
- Tell me about your typical diet.
- Do you eat at least 5 servings of fruit and non-starchy vegetables a day?
- How often do you eat dark green vegetables?
- Do you use oils in cooking or at the table, like safflower, canola, wheat germ oils, margarine?
- Are you taking any vitamins or other nutritional supplements?
- Do you eat any foods that are fortified with nutrients, like cereals?

Done

# Use of Assessment Skills in Practice

## Dietary vs Supplement Intake



Assess Mr. Bradley's dietary and supplement intakes separately. Then, press the Check button.

### Dietary Intake

#### Vitamin E

- Below RDA.
- At RDA.
- Above RDA.

#### Vitamin C

- Below RDA.
- At RDA.
- Above RDA.

### Supplement Intake

#### Vitamin E

- Below RDA.
- At RDA.
- Above RDA.

#### Vitamin C

- Below RDA.
- At RDA.
- Above RDA.

# Testing of the Learned Skills

## Final Exam

Q:

9 of 16



Which of the following patients are at increased risk for low antioxidant intake?

- A 6-year-old who won't drink milk.
- A 6-month-old breastfed infant who just started solid foods.
- A 75-year-old woman living in an assisted living facility.
- A 23-year-old college student following a vegetarian diet.
- A picky 10-year-old who doesn't like vegetables and fruit.

### Explanation:

No. People who eat few fruits and vegetables are at risk for low antioxidant intake.

# Review of Self-efficacy

## Survey

**Q:**

2 of 5



I feel prepared to counsel patients in the areas covered by the module.

- A** strongly agree
- B** agree
- C** neutral
- D** disagree
- E** strongly disagree

## Clinical Practice

	<b>2008</b>	<b>2012</b>
<b>Clinical Practice (% of schools offering)</b>	6.4 hours (44%)	6.4 hours (45%)
<b>Response Rate</b>	86%	91%

# Virtual Cases

Online virtual patient interactions with immediate feedback can strengthen clinical nutrition competencies.

**YOUR PERFORMANCE** 01:06 **Current Stage: Contemplation** **PATIENT**

Motivational Interviewing:  **novice Expert**

Use of SOC:  **novice Strong**

Patient Attitude:  **negative Positive**

What do you want to say next?

Your risk for a heart attack is not that high given your lab values.

Your risk for a heart attack in the next ten years is much higher than the average person at your age. I would be worried if these were my lab values.

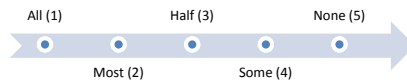
Based on your current values, your risk of having a heart attack any time in the next ten years will be about one in twenty five.

To help motivate you, let me tell you that your risk of having a heart attack any time in the next ten years will be about 4%. Some modest lifestyle changes will make a big difference.

(None of the above, click to view other options...)

AAMC

In your last four patient encounters, how often did you...



	Pre-test Average	Post-test Average	P value
OB – Address nutritional issues	3.14+/-1.31	3.06+/-1.24	0.723
OB – Advise re: weight gain	3.28+/-1.39	2.81+/-1.21	0.081
<b>OB – Calc BMI</b>	<b>2.44+/-1.46</b>	<b>1.77+/-1.10</b>	<b>0.029</b>
<b>OB – Assess readiness to change</b>	<b>3.83+/-1.21</b>	<b>3.36+/-1.36</b>	<b>0.045</b>
<b>GYN – Address nutritional issues</b>	<b>4.29+/-0.83</b>	<b>3.66+/-0.968</b>	<b>&lt;0.001</b>
GYN – Calc BMI	2.92+/-1.56	2.42+/-1.52	0.110
<b>GYN – Assess readiness to change</b>	<b>4.03+/-1.08</b>	<b>3.53+/-1.36</b>	<b>0.014</b>
GYN – Discuss weight loss methods	3.92+/-1.25	3.67+/-1.19	0.22

Kaplan et al., 2013



## Challenges and Lessons Learned

- Too few medical schools prepare their students for everyday nutrition challenges in clinical practice
- The biggest barrier to getting more nutrition into the curriculum is the lacking sense of urgency
- Clinical training with common patient scenarios is almost non-existent and needs to be added
- Multi-layered, repeated nutrition exercises and learning opportunities are needed across all 4 years
- Students need more role modeling of clinical nutrition practice in all relevant medical disciplines



## The Really Hard Parts

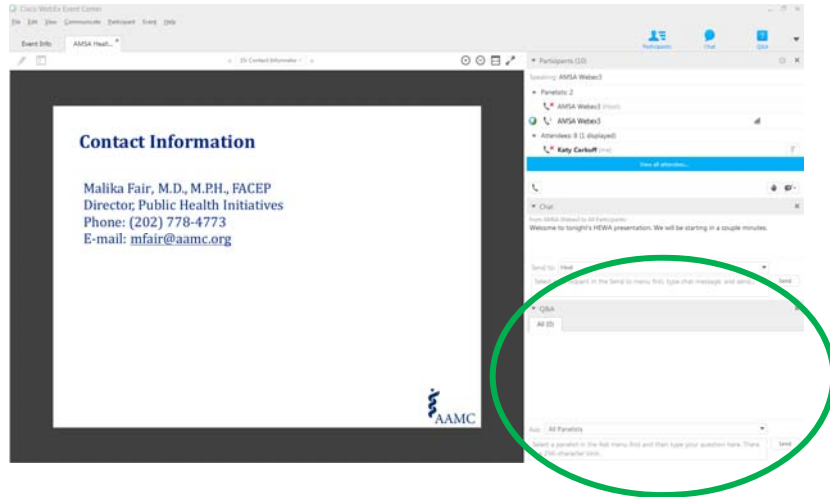
- Building good nutrition education tools is expensive
- Materials need to be overhauled every 4-5 years
- Support of online learners is resource-intensive
- Few funding sources for development and delivery
- Everyone assumes that online materials are free





## Q&A Session

Type your questions in the 'Q&A' box at the bottom right of your screen and send to "All Participants"



## Virginia Uhley, M.S., Ph.D., R.D.N.



- Appointment in Biomedical Sciences at Oakland University William Beaumont (OUWB) SOM
- Fellowship in medical education and a medical education certificate at OUWB SOM
- Former Director of the Longitudinal Nutrition Curriculum at the University of Michigan Medical School
- Graduate degrees in Nutrition and Food Science, Wayne State University



## Objective

To provide an overview of longitudinal integration of nutrition education in the medical school curriculum



## Assessment of the Curriculum

### Critical Review

- Where does nutrition need to be integrated?
- Are nutrition topics already addressed within existing courses/clerkships?
- Are there knowledge or application gaps that need to be addressed?
- Do you have faculty with the necessary expertise to teach clinical and community nutrition education?
- Is there a mechanism that would allow for maintenance of the nutrition education curricula components?



## Lessons Learned: Integrating Nutrition in the Medical School Curriculum

1. Meet with the Dean, Associate Dean of Medical Education, and Curriculum Committee.
2. Identify curricular mapping tools that will identify subject content.
3. Look for opportunities to co-teach/interprofessional education.
  - Find out if there are discipline teams.
4. Survey or use focus groups of faculty and students.
5. Use published resources as guides to develop vertical and horizontal integration.

*Overall: Document recommendations, support with evidence, document specific short-term and long-term goals. Make sure to focus on longitudinal curricula design.*



## Core Medical School Nutrition Concepts

- Basic nutrition science
- Clinical Nutrition assessment techniques
- Practical Nutrition Consultation and Medical Nutrition Therapy
- Prevention and lifestyle recommendations
- Community Nutrition: public health and population health

Nutrition Academic Award:  
<https://www.nhlbi.nih.gov/research/training/naa/>



## AAMC: Public Health Matters to Medical Care and to Medical Education

Epidemiology, the core discipline of public health, is essential to understanding the cause and distribution of disease

Independently interpret the medical literature

Apply findings to individual patients

Central to sound medical care and health policy and public health practices

Fineberg HV. Public health and medicine: where the twain shall meet. American Journal of Preventive Medicine. 2011; 41(4 S3): S141-S143.



## AAMC: Public Health Matters to Medical Care and to Medical Education

Public health teaches the influence of environmental, nutritional, social, and behavioral factors on health, illness, recovery, and wellness

Understand the etiology and optimal management of disease

Appreciate multiple origins of illness

Integrative explanation of illness that embraces genetic, molecular, biochemical, and physiological factors with behavioral, social, nutritional, and environmental factors

Fineberg HV. Public health and medicine: where the twain shall meet. American Journal of Preventive Medicine. 2011; 41(4 S3): S141-S143.



## AAMC: Public Health Matters to Medical Care and to Medical Education

Understanding the role and potential for public health interventions better positions physicians to improve patient health and foster interdisciplinary collaboration

Interventions include: public health education, social campaigns, ordinances and laws, standards and regulations, surveillance and preparedness

Gain a deeper understanding of the conditions that preserve health, of the primacy of disease prevention, and of the interfaces between personal medical care and community health protection

Fineberg HV. Public health and medicine: where the twain shall meet. American Journal of Preventive Medicine. 2011; 41(4 S3): S141-S143.



## Developing Nutrition Application Skills

To address population health, medical students need the opportunity to develop nutrition application skills that address chronic disease issues:

- DASH (Dietary Approaches to Stop Hypertension) diet to reduce hypertension
- Carbohydrate counting to help manage diabetes
- Therapeutic lifestyle changes/Mediterranean diet to better control hyperlipidemia
- Caloric control and lifestyle changes to better control overweight, pre-diabetes, and obesity



## Need to Integrate Nutrition Competencies

- NIH Guidelines for the prevention and treatment of obesity, diabetes, hypertension, coronary artery disease, cancer, osteoporosis
- U.S. Dietary Guidelines
- Healthy People 2020



## Collaborate with Other Medical School Faculty Involved in Nutrition Education: Local, Regional, National Groups

### Michigan Medical Nutrition Education Consortium (MMNEC)

- Established by the Michigan State Medical Society in 1997 to support and advance nutrition education in the medical school curriculum.
  - Members are designated nutrition faculty appointed by the Dean of each medical school and representatives from state and community health agencies in Michigan.
    - They collaborate on common curriculum development and public health concerns.
  - Mission: share instructional/research resources and promote visibility/enhance the recognition of nutrition in medical training and practice.
  - Provide an ongoing comprehensive review of nutrition content in medical school curricula.



## Highlights of MMNEC National and Regional Accomplishments

- MMNEC made the first nationwide impact on nutrition in the medical school curriculum by initiating the **first formal application to the National Board of Medical Examiners Step 1 committee**
  - Established nutrition as the first integrated topic to be considered; Step 1 nutrition sub-score was first reported in 2002
- MMNEC received grant funding to develop medical student nutrition training resources:
  - Standardized patient: overweight/obesity case (2003)
  - Online modules: integration of basic science knowledge in patient care scenarios - diabetes and hyperlipidemias (2003)



## University of Michigan Medical School Standardized Patient Case

### **The Nutrition and Physical Activity (NPA) scenario:**

- Incorporates a single mother in her mid-fifties, working full-time and struggling with two teenagers.
- She has just received a diagnosis of pre-diabetes and is now seeking help with weight loss and improved eating habits.

### **Professional Skill Builder (PSB) Web-based modules:**

- Interactive clinical cases.
- Video clips show patients at various levels of confidence and conviction associated with healthy lifestyle behavior changes.
- Case vignettes also provide a physician “role-model” their counseling approach based on the patient’s current state of readiness for behavior change.



## University of Michigan Medical School Nutrition Education Curriculum

- <http://www.med.umich.edu/lrc/nutrition/>
- A webpage resource for medical students to identify nutrition related education sessions and topics.



## Examples: Oakland University William Beaumont School of Medicine Nutrition Education Curriculum

- Educational philosophy: holistic approach to health promotion, including an emphasis on social determinants of health and community engagement
- Innovative nutrition curriculum examples:
  - Biochemistry:
    - **Interprofessional Blood Glucose Laboratory:** <https://www.mededportal.org/publication/9978>
  - Longitudinal Promotion and Maintenance of Health and Medical Humanities/Clinical Ethics:
    - **Food Insecurity:** <http://www.oakland.edu/medicine/compass> (community-based assignments, research, and engagement)
  - Vertical and horizontal integration of nutrition curriculum themes within basic science, organ system-based courses, and clerkships (Family Medicine, Pediatrics, OB/GYN)





## Nutrition Education Integrated in M1 OUWB Medical School Curriculum

- **Promotion and Maintenance of Health:** Nutrition Assessment, Interprofessional Glucose Lab
- **Medical Humanities and Clinical Bioethics:** Medical Interviewing
- **Art and Practice of Medicine:** Standardized Patient Overweight/Obesity
- **Biomedical Clinical Foundations of Practice:** Nutrition Pathology
- **Biomedical Clinical Foundations of Practice:** Problem Solving Clinical Nutrition/Biochemistry
- **Biomedical Clinical Foundations of Practice:** Nutrition in Practice - Inborn Errors of Metabolism
- **Cardiovascular:** Nutrition in Practice - Cardiovascular Disease
- **Capstone Research (M1-M2):** Nutrition Ed/Food Insecurity/Diabetes/Obesity



## Longitudinal Integrative Case Studies

- Integrate knowledge of basic science, clinical medicine, public health, and population health.
- Allow medical students the opportunity to apply and demonstrate strategies that integrate clinical care with public health approaches to improve the health of individuals and communities.
- Allow medical students to expand their knowledge of community resources that impact the health of individuals and populations.



## Nutrition Education Integrated in M2 OUWB Medical School Curriculum

- **Promotion and Maintenance of Health**
  - Food insecurity, dietary supplements, fad diets
  - Longitudinal case studies
- **Renal and Urinary**
  - Chronic kidney disease medical nutrition therapy
- **Male and Female Reproductive**
  - Pregnancy nutrition guidelines
- **Medical Humanities and Clinical Bioethics**
  - Integrative medicine elective



## Other Initiatives to Enhance Nutrition Education

- Nutrition and Medicine: University of North Carolina
- Fellowship and Residency online curricula: University of Arizona Center for Integrative Medicine
- Healthy Kitchens, Healthy Lives: Harvard T.H. Chan School of Public Health
- Fellowship in Pediatric Nutrition: University of Colorado School of Medicine
- Student Nutrition Awareness and Action Council (SNAAC): Boston University School of Medicine
- Wholesome Wave's Fruit and Vegetable Prescription Program (FVRx)
- Promotion of Maintenance of Health longitudinal course: OUWB School of Medicine
- The Goldring Center for Culinary Medicine: Tulane School of Medicine
- Medical Nutrition Program for Health Professionals: Columbia University Medical Center
- Food as Medicine: Center for Mind-Body Medicine



## National Organizations/Groups

- **American Nutrition Society (ANS)**
  - <http://www.nutrition.org/education-and-professional-development/medical-professional-development/>
- **Society of Teachers of Family Medicine (STFM) - Nutrition Education Group**
  - <http://www.stfm.org/Groups/GroupPagesandDiscussionForums/NutritionEducation>
- **The Obesity Society (TOS)**
  - <http://www.obesity.org/home>
- **Academy of Nutrition and Dietetics**
  - <http://www.eatright.org/>
- **Teaching Nutrition and Physical Activity in Medical School: Training Doctors for Prevention-Oriented Care**
  - <http://greenvillemed.sc.edu/doc/Nutrition-and-Physical-Activity-Initiative.pdf>
- **American College of Lifestyle Medicine (ACLM)**
  - <http://www.lifestylemedicine.org/>



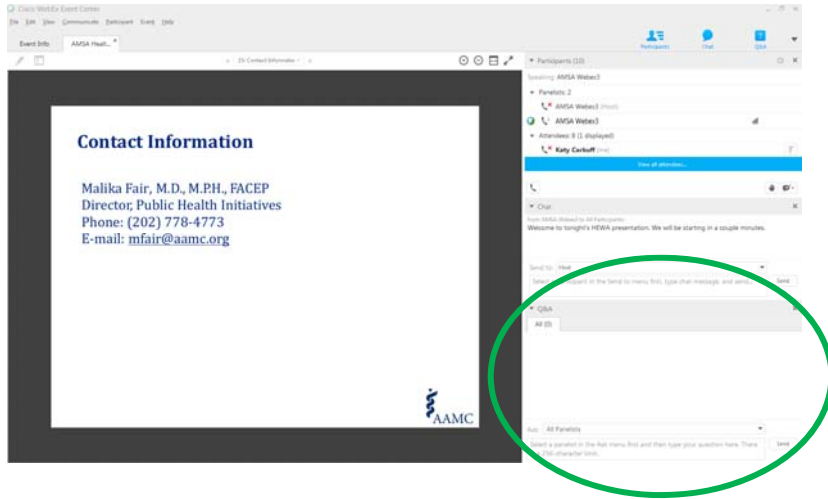
## Challenges

- Time/hours in the curriculum
- Available expertise
- Ability to maintain and update curriculum
- Lack of nutrition-related professional competencies
- New curriculum changes
- New EPA development
- Need for CME that includes topics in nutrition science and health promotion
- Need consistent and sufficient reimbursement for services that target lifestyle factors like nutrition and exercise
- Need to integrate nutrition skills that address continuum of care concepts
- Need interprofessional education models that integrate nutrition and promote team-oriented care



## Q&A Session

Type your questions in the 'Q&A' box at the bottom right of your screen and send to "All Participants"



## Closing Remarks Malika Fair, M.D., M.P.H.



Director of Public Health Initiatives  
Association of American Medical Colleges



## Public Health Initiatives at AAMC

- *Diversity Policy and Programs* promotes, advances, and drives diversity and inclusion along the medical education continuum with work in three portfolios:
  - Human Capital
  - Organizational Capacity Building
  - **Public Health Initiatives**
- Improving the integration of public health concepts into medical education and seeking to enhance and expand a diverse and culturally prepared health workforce.



## MedEdPORTAL® Public Health Collection



Consider submitting your curricular innovation to be included in the **Public Health Collection** of AAMC's MedEdPORTAL®, a free, cross-indexed suite of services that aims to equip healthcare professionals across the continuum with effective and efficient educational tools to improve patient care.



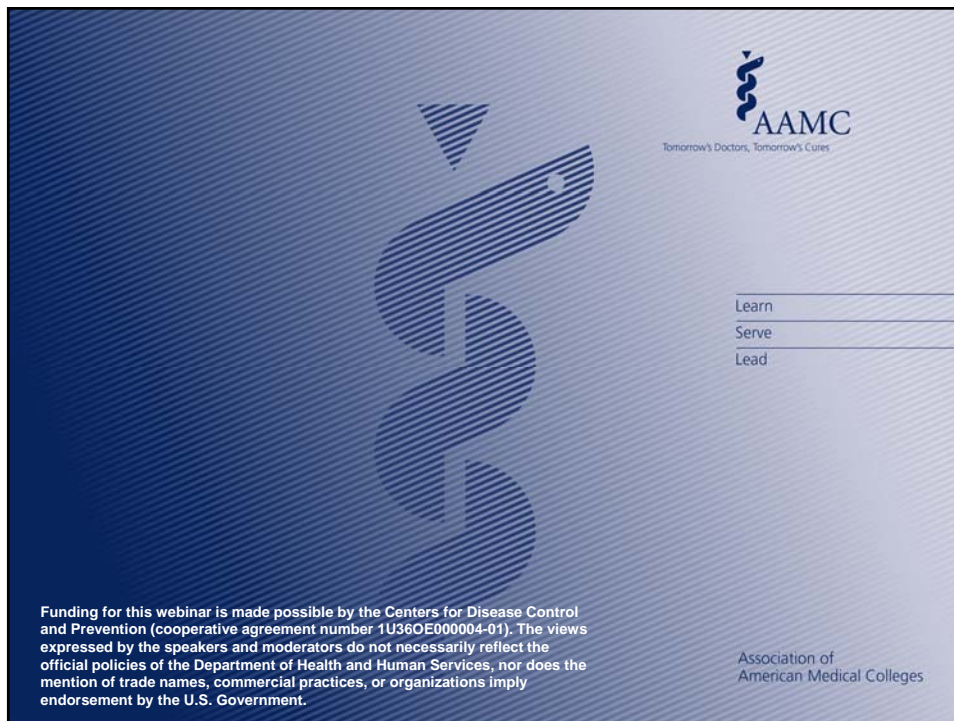
## Public Health Pathways



An online searchable database of domestic and international public health training opportunities for:

- ✓ Pre-med/Pre-health Students
- ✓ Medical/Graduate Students
- ✓ Residents/Postdocs
- ✓ Early Career Physicians & Scientists

Visit **Public Health Pathways** at:  
[www.aamc.org/phpathways](http://www.aamc.org/phpathways)

The slide features a large, stylized blue caduceus symbol in the background. In the top right corner, the AAMC logo is displayed with the tagline "Tomorrow's Doctors, Tomorrow's Cures". Below the logo, the words "Learn", "Serve", and "Lead" are listed vertically, each underlined. In the bottom left corner, there is a block of text regarding funding and disclaimers. In the bottom right corner, the full name of the organization is provided.

Learn  
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Lead

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